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THE ADMINISTRATION OF THE FORESTS OF THE PUBLIC DOMAIN.

BY

HENRY GANNETT.

In that part of the country lying east of the Great Plains the Government has practically disposed of all its forest lands. Indeed, in several of the States of the Mississippi Valley, Illinois, Indiana, Iowa and Ohio, the United States has parted title to all of the lands which it once held. In all the other States east of the Great Plains in which the United States once owned land, it still retains only 26,822 square miles, or five and one-quarter per cent. of their total area. Three-fifths of this area is in the two States of Arkansas and Minnesota. In Arkansas 7,238 square miles, or 13.64% of its surface, still remain in the hands of the Government, and consist of small areas widely scattered. In Minnesota the United States still owns 8,787 square miles, or 11.9% of the State. This area lies mainly in the northern part of the State, a great portion of it being in one body, and all of it being heavily timbered.

In the States of the Cordilleran region the situation is entirely different, the proportion still owned by the Government being much larger, ranging from 49% in Washington to 95.3% in Nevada. In these States the areas which have been alienated by the Government consist, in the main, of valley lands, which, as a rule, are not forested. Thus, in California the lands in private ownership lie mainly in the great Sacramento and San Joaquin valley, and in the valleys among the Coast ranges, the tracts which have been taken up in the timbered region of the Sierra being small and few. In Oregon the greater portion of the alienated land is in the Willamette Valley, which is only partially timbered. In Colorado the lands which have been taken up are mainly upon the plains at the east base of the mountains and in small areas in the mountain valleys. The mountain lands, which are the timbered lands of this State, have been almost untouched by the settler.

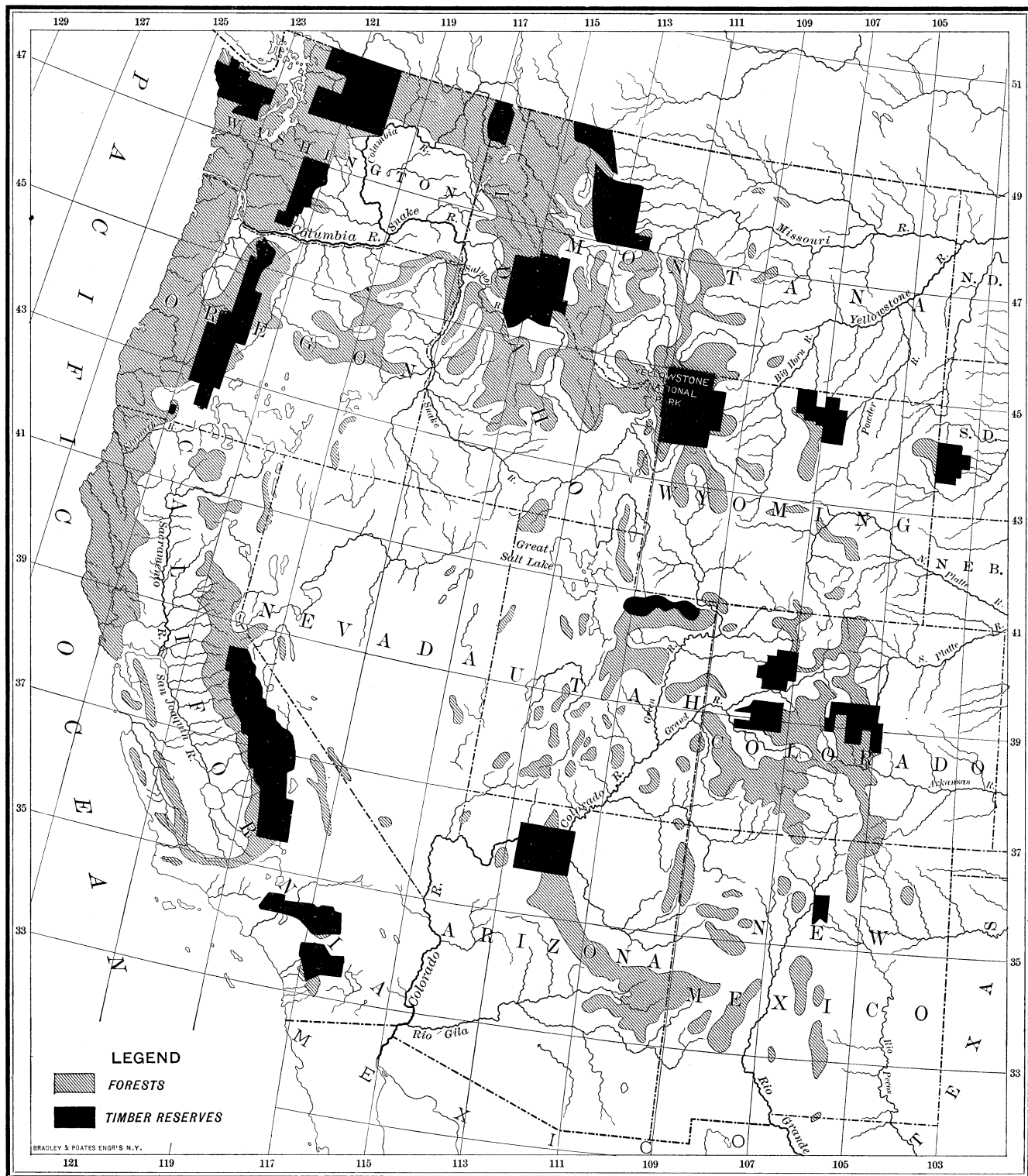
The forests of the Cordilleran region are principally found upon the mountains and high plateaux, the valleys and plains being without forest covering. In the main, the forests in this region are sparse and composed of small trees, principally conifers. Such is

the case with the forests of Colorado, New Mexico and Utah. In Arizona, however, upon the borders of the Mogollon plateau and about the San Francisco Mountains, extending thence northward across the Colorado River, is a forest of magnificent timber, covering an area of several thousand square miles. In the Sierra Nevada also is a large body of fine timber, but the most extensive and valuable forest of the West is that which covers the northern and coast ranges of California, the Coast Ranges and Cascade Range of Oregon and Washington, the mountains in the northeastern part of the latter State, and the Rocky Mountains in western Montana, northeastern Idaho and the Yellowstone Park. In Oregon, Washington and northern California these forests are very dense, composed in the main of large and valuable trees, and constituting one of the most important sources of lumber supply which this country possesses. The distribution of forests in the Cordilleran region is shown upon the accompanying map.

The use and application of the word "forest" in this connection requires explanation. It is here applied only to timber of merchantable size, such timber as is suitable for saw logs. It does not include such as is useful only for fire wood, fence rails, posts, etc., nor does it include mezquite, piñon, cedar or quaking aspen. The areas covered by these species would extend greatly the wooded areas of the West; indeed, would more than double them, and for all supposed influence upon climate, soil erosion, etc., such a tree covering is as potent for good as is the larger growth.

The influences which induce this distribution of forest over the Western country are, of course, climatic, and consist mainly in the rainfall; indeed, a rainfall map is a forest map. The heavy timber growth in the Northwest accompanies the well-known heavy rainfall, and the presence of timber upon the high mountains and plateaux accompanies the heavy rainfall upon these regions. In those parts of the arid region which are now timbered the amount of rainfall is barely sufficient to induce tree growth, and if the timber were destroyed it is doubtful whether, with the present supply of moisture, it would ever restore itself without artificial encouragement. In the Northwest and in the Eastern States, where the rainfall is ample for tree growth, such growth restores itself promptly when the forests, either by burning or cutting, are destroyed, but such is not the case in the arid regions. If it is desirable, therefore, that forests be perpetuated in this region they must be protected.

To the question whether it is desirable to maintain the forests of this region, there can be but one answer. Forests should be



THE WESTERN STATES AND TERRITORIES, SHOWING FOREST LAND AND FOREST RESERVES.

maintained, chiefly to provide continuous local supplies of timber. Timber is too bulky and cheap a commodity to bear long carriage. It should be produced as nearly as possible in the locality in which it is consumed. For this reason, if for no other, the forests of the West should be protected from all sources of waste, and perpetuated, if possible, while at the same time supplying local needs.

The physical and climatic aspects of the forest are little known. The influence of forests upon rainfall, humidity, temperature, the flow and regimen of streams has been widely discussed, but most of the discussion has been purely theoretical. Such data as we have indicate that forests have no appreciable climatic influence. Whether they have an influence upon the flow and regimen of streams has never been proved, although the popular belief is that they have a beneficial influence. However this may be, the necessity of maintaining local supplies of timber affords a sufficient motive for maintaining our Western forests.

The enemies of the forest are two in number; at least there are but two which are of importance, fire and the axe. Of these the more disastrous by far is the former. We know approximately the amount of destruction by the axe, but we have no means of even estimating that by fire. Such estimates as have been made are greatly exaggerated, but they suffice to show that the destruction is enormous, and means should be found for its prevention. On the other hand, the cutting of timber is a necessity of civilization. It is a foregone conclusion that it must go on, constantly increasing in amount. The cutting of timber, however, should be controlled, so far as practicable to do so, by such regulations as will insure, if possible, a continuous supply. Wasteful methods should be discouraged or prohibited, and mature trees only should be cut.

We know very little of our timber supply; indeed, the only data concerning it which have ever been collected are furnished by the investigation made by the Tenth Census, under Prof. C. S. Sargent, and this was by no means complete, since it related only to certain species in certain areas. All the discussion and agitation upon the subject of our forests and timber supply, which have been going on for generations, have had little basis of fact. Even the area occupied by our timber crop is unknown probably to the extent of 50%. We do not know whether 25% or 37% of the area of the country is woodland. Still less idea have we concerning the amount of standing timber, suitable for commercial purposes, upon these areas. Of the supply of timber of certain species our information is woefully at fault. The case of the white pine supply, to which considerable

attention has been given, is one in point. In 1880, after what was regarded as a quite full investigation, it was reported that the supply was sufficient to last but eight years longer, but white pine is still in the market, and its price has not greatly appreciated, and this year it is reported that the supply is still sufficient for five or six years longer, this statement being based, however, upon the guesses of certain State officials of Minnesota, Wisconsin and Michigan.

It is this want of data which has made it possible for sentiment-alists to gain a following in their absurd statements regarding the condition of our forests, and, upon the other hand, it has prevented reasonable, practical men, who are in a position to regulate these matters, from taking action upon them.

At present there is no means provided by law whereby timber-land or the timber upon the land can be obtained from the Govern-ment in large quantities; in other words, there is no lawful means by which saw mills, the great mines and other industrial enterprises can obtain supplies of lumber from the Government lands. It is true that settlers are permitted to cut timber upon Government lands for household purposes, fencing, etc., and that in the States of the extreme Northwest settlers are permitted to purchase timber lands from the Government, at \$2.50 per acre, to the extent of a quarter section each. The lumbermen are therefore driven to the alternative of purchasing land from railroads or settlers, of enter-ing timber land fraudulently or of stealing timber from the Govern-ment domain. That vast amounts have been thus stolen, it is unnecessary to add, and that the stealing goes on continually, with little hindrance from Federal authorities, is perfectly well known. However this may be condemned, the fact must not be lost sight of that the people of this region are, in a certain way, driven to crime by the negligence of our law-makers in failing to provide a remedy by law. This demoralizing state of things should be brought to a speedy end.

In order to check the rapid destruction of timber in the far West, Congress has been urged for many years by representatives of the Division of Forestry of the Department of Agriculture, and of the American Forestry Association, to adopt restrictive legisla-tion. The first fruits borne by this agitation consisted in the pas-sage, on March 3, 1891, of a bill providing that the Government should own and hold in perpetuity certain lands designated as forest lands. This bill runs as follows:

“ That the President of the United States may, from time to time, set apart and reserve in any State or Territory having public land bearing forests, in any part of

the public lands, wholly or in part covered with timber or undergrowth, whether of commercial value or not, as public reservations, and the President shall, by public proclamation, declare the establishment of such reservations and the limits thereof."

There was coupled with this legislation no provision for administering these lands, or regulating the cutting of timber upon them, but the bill simply gave the President authority to set aside and reserve them. Under this authority Presidents Harrison and Cleveland did, from time to time, declare certain areas reserved by Executive proclamation, the whole amounting, in the early part of the latter's administration, to some seventeen and a half million acres.

Further agitation by the friends of this reserve policy resulted, in the fall of 1895, in a request from the Secretary of the Interior to the National Academy of Sciences that it consider the question of a forest policy and report thereon. The Academy thereupon appointed a Committee for this purpose, and an appropriation of \$25,000 was made by Congress to pay the expenses of the inquiry. After spending the summer of 1896 in the West, and examining most of the forested regions of that part of the country, the Committee made a preliminary report to the Secretary of the Interior, recommending thirteen additional reservations, comprising some twenty million acres, thus more than doubling the reserved area, and these reserves were created by Executive order issued on February 22, 1897. The full report of this Committee was made on May 1, 1897.

The location and approximate area and extent of all the reserves are shown upon the map, being superimposed upon the representations of forests.

The following are the leading characteristics of the reserves:

The Black Hills Reserve, located in the southwestern part of South Dakota, has an area of 967,630 acres, or about 1,500 square miles, and includes the higher portion of the Black Hills, and most of the valuable timber of the State. It is traversed from north to south by a branch of the Burlington and Missouri River Railroad, and contains numerous small towns and many mines, none of which, however, are of great importance. There are many squatters scattered over it, located mainly in the valleys, and the timber is in extensive use by mining companies, particularly the Homestake Company, which uses vast quantities for mine timbering and for fire wood.

In Wyoming there are three reserves, known as the Big Horn, Yellowstone Park and Teton reserves. The first of these includes the highest portion of the Big Horn Mountains, in the northern part of the State, extending on the east down to the edge of the plain. It has an estimated area of 1,198,080 acres or about 1,870

square miles. The land embraced in this reserve ranges in altitude up to nearly 12,000 feet above sea, and contains the sources of many streams flowing to Yellowstone and Big Horn rivers. Settlement upon the area of this reservation has thus far been trifling. The timber is not large and is of use mainly for domestic and farm purposes.

The reservation east of Yellowstone National Park is known as Yellowstone Park Reserve, and has an estimated area of 1,826 square miles, or 1,168,640 acres. It includes the portion of the high mountains known as the Absaroka Range, which divides the waters of Yellowstone River from those of Big Horn River. The range is extremely rugged and the timber upon it is not commercially of great value.

The Teton reservation lies south of the Yellowstone National Park, and includes the upper portion of the valley known as Jackson's Hole, with the Teton Range upon the west and the Grosventres upon the east. The area is 829,440 acres, or about 1,300 square miles. There is some valuable timber upon the lower mountains, but the higher mountains are bare or covered with shrub growth. The amount of settlement is trifling.

There are two reserves in Montana, besides a portion of a third, all in the western part of the State. The most northern of these is known as Flat Head Reserve, which extends from near the line of the Great Northern Railroad to the international boundary, with an estimated area of 1,382,400 acres, or about 2,160 square miles. It includes the Front Range of the Rocky Mountains, from the summit down either flank to the base. Within it are many high mountains, several of which are covered with glaciers. Little settlement has been effected upon it, that little mainly near the western border.

South of the latter is the Lewis and Clark Reserve, which embraces both slopes of the Front Range of the Rocky Mountains, extending from the plains on the east to the shores of Flathead Lake on the west, and embracing an area of 2,926,080 acres, or about 4,570 square miles. Its forests are of considerable value commercially, and settlement upon it thus far has been slight.

Idaho has two reserves, the Priest River Reserve on the north, and the Bitter Root Reserve on the south. The former includes practically the drainage basin of Priest Lake and River. It has an estimated area of 645,120 acres, or 1,000 square miles, five-sixths of which is in Idaho, the remainder being in Washington. This reserve includes one of the most valuable bodies of timber to be found in the interior of the continent, composed of Western white pine, tamarack, cedar and spruce, all of large size.

The Bitter Root Reserve includes a large area of country about the headwaters of Salmon and Clearwater rivers. It has an area of 4,147,200 acres, or about 6,480 square miles, nearly all of which is in Idaho, the remainder being upon the east side of Bitter Root Mountains in Montana. It is a high, rugged mountain region, covered with forests of yellow and other pines, spruce, fir and cedar, which are of great value, especially to the mining industries of the neighborhood.

In Washington are three reserves, known as the Washington, Olympic and Mount Rainier Forest reserves. The first of these is in the northern portion of the State, its northern limit being the international boundary. It has an area of 3,594,240 acres, or about 5,620 square miles. It includes both slopes of the Cascade Range and is entirely covered with dense forests of the greatest commercial value.

The Olympic Reserve includes most of the area between Puget Sound and the Pacific coast, having an area of 2,188,800 acres, or 3,420 square miles. It includes the Olympic Mountains, a rugged range rising in its summits to altitudes of 8,000 feet, and densely clothed with forests of the greatest commercial importance, which are as yet hardly touched by the axe. It contains no agricultural lands, nor have any minerals yet been discovered upon it, still a large number of entries have been made for the use of timber.

The Mount Rainier Reserve includes what was formerly known as the Pacific Reserve, and comprises much of the southern half of the Cascade Range in the State of Washington. It includes an area of 2,234,880 acres, or 3,510 square miles. Within it is Mount Rainier, rising to an altitude of 14,500 feet, and covered with glaciers. Excepting such portions of the reserve as rise above the timber line it is heavily forested, and its forests are of the first commercial importance.

Practically the entire Cascade Range in Oregon has been reserved in a series of reservations extending from Columbia River nearly to the south boundary of the State. These reserves, which are practically one, are known as Bull Run and Cascade Range, and comprise an estimated area of 4,700,000 acres. With the exception of the extinct volcanoes which rise above timber line, this region is heavily forested with timber of great commercial value.

In southwest Oregon, near the City of Ashland, is a small reservation, comprising about a township.

In California there are a number of reserves, Stanislaus, Sierra, San Bernardino, San Gabriel, San Jacinto and Trabuco Cañon.

The Stanislaus and Sierra reserves, together with the Yosemite and Sequoia National Parks, form a continuous reserve, comprising the highest portion of the Sierra Nevada from latitude 38.30 to the southern end of the range. Their collective area is 6,144,000 acres, or 9,600 square miles. The timber in these reserves is not of commercial importance, but owing to the fact that the agriculture of the San Joaquin Valley is dependent upon streams which head in this region, the protection of the forest cover is of great economic value.

The San Gabriel and San Bernardino reserves are in southern California, and being conterminous, they include most of the mountain range north of the Los Angeles and San Bernardino valley. These mountains contain but little timber, and that is not of commercial importance, but they are covered with dense chaparral. They include an area of 1,152,000 acres, or about 1,800 square miles.

The San Jacinto Reserve includes the higher portion of the San Jacinto Mountains south of San Bernardino. The area is 737,280 acres, or about 1,150 square miles. These mountains also contain very little timber, being almost entirely covered with chaparral.

The Trabuco Cañon Reserve lies near the coast in southern California, a short distance southeast of Los Angeles, and comprises a portion of the Santa Ana Mountains. Its area is about 100 square miles, or 64,000 acres. It contains no forests whatever, but is covered with chaparral.

It is not easy to see what motive actuated those who urged the establishment of these last four reserves. They contain no timber of commercial importance, but are covered with dense chaparral. This covering of brush is, of course, of value in regulating the flow of streams from these mountains, but since it is otherwise of no earthly use, it is not likely to be disturbed. It would be quite as reasonable to reserve tracts of sagebrush or greasewood.

Utah contains but one reserve, known as the Uinta Reserve. Its area is 960,000 acres, or about 1,500 square miles. It is located in the northeastern part of the State, and includes the highest portion of Uinta Mountains, rising to altitudes of 13,700 feet. The range is sparsely timbered with spruce, which will doubtless be of commercial importance in the future.

In Arizona one area only has been reserved, under the name of the Grand Cañon Reserve. This is a rectangular area in the northern part of the Territory, including a portion of the Grand Cañon of the Colorado. Its area is 1,851,520 acres, or 2,910 square miles.

It is timbered mainly with an open growth of piñons and cedars, with some pine on the plateau on the northern side of the Colorado.

There are several reserves in Colorado, known as Pike's Peak, Plum Creek and South Platte reserves, which three form practically one reserve, White River Reserve, in the northwestern part of the State, and Battlement Mesa Reserve, in the western portion, between Grand and Gunnison rivers.

The first three above mentioned include the mountain region from Pike's Peak northward, the Front Range and the ranges east and west of South Park. The area of the three reserves collectively is 1,308,800 acres, or 2,045 square miles. The region is nowhere heavily timbered, but the timber is of great local importance to mines and the settlements of adjacent regions.

White River Reserve has an area of 1,280,000 acres, or 2,000 square miles. It includes a group of high plateaux, rising to altitudes of 11,000 or 12,000 feet above sea, about the sources of White River, a branch of Green River, and tributary to the Colorado. These plateaux are covered with heavy forests.

Battlement Mesa Reserve has an area of 696,000 acres, or 1,400 square miles. It is mainly included in high plateaux, whose summits are 10,000 feet above the sea, covered with a sparse growth of timber, of no great commercial importance.

In New Mexico there is but one reserve, known as Pecos River Reserve. It includes a portion of the Sangre de Cristo Range northeast of Santa Fé. Its area is 304,000 acres, or 475 square miles. It is sparsely timbered, and its forests are of only local economic importance.

These reserves collectively comprise an area estimated at 38,880,000 acres, or over 60,000 square miles.

The following table summarizes the areas and adds the proportion of the timbered area of each State which has been reserved, taken from the Washington Letter in the BULLETIN for March, 1897:

	AREA SQUARE MILES.	PERCENTAGE TIMBERED AREA OF STATE.
ARIZONA:		
Grand Cañon Reserve.....	2,910	9.90
CALIFORNIA:		
Stanislaus and Sierra Reserves, Yosemite and Sequoia National Parks.....	9,600	
San Gabriel and San Bernardino Reserves.....	1,800	
San Jacinto Reserve.....	1,150	
Trabuco Cañon Reserve.....	100	
Total.....	12,650	15.26

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	AREA SQUARE MILES.	PERCENTAGE TIMBERED AREA OF STATE.
COLORADO:		
Pike's Peak, Plum Creek and South Platte Reserves.....	2,045	
White River Reserve.....	2,000	
Battlement Mesa Reserve.....	1,400	
Total.....	5,445	12.61
IDAHO:		
Priest River Reserve (in part).....	864	
Bitter Root Reserve (in part).....	5,400	
Total.....	6,264	12.37
MONTANA:		
Flathead.....	2,160	
Lewis & Clark.....	4,570	
Bitter Root (in part).....	1,080	
Total.....	7,810	14.04
NEW MEXICO:		
Pecos River Reserve.....	475	0.96
OREGON:		
Bull Run and Cascade Range.....	7,344	
Ashland.....	36	
Total.....	7,380	12.57
SOUTH DAKOTA:		
Black Hills Reserve.....	1,500	96.76
UTAH:		
Uinta Reserve.....	1,500	3.94
WASHINGTON:		
Washington Reserve.....	5,620	
Olympic Reserve.....	3,420	
Mount Rainier.....	3,510	
Priest River (in part).....	136	
Total.....	12,686	25.00
WYOMING:		
Big Horn Reserve.....	1,870	
Yellowstone Park Reserve.....	1,826	
Teton Reserve.....	1,300	
Total.....	4,996	18.26

Several of these reserves are either wholly or in part within the limits of railway land grants. Lewis and Clark and Priest River Reserves lie almost wholly within the grant to the Northern Pacific Railway. The northern portion of the Mount Rainier Reserve also falls within it. The southern half of the Grand Cañon Reserve is within the limits of the grant to the Atlantic & Pacific Railroad, and

large portions of the reserves in southern California are within the grant to the Southern Pacific Road. Within these areas the railroads own alternate sections. In these cases it is proposed to allow the railroads to select lands in other localities to recoup themselves for the lands thus reserved. It is, however, doubtful whether the railroads will be willing to make the exchange, in view of the fact that practically all of the public lands which are of value, excepting the forest lands, have already passed into private hands.

In looking over the list of reserves one is struck particularly by the omissions. The finest body of timber in the West, excepting in Oregon, Washington and northern California, is that upon the San Francisco and Mogollon plateau. Here is an open forest covering thousands of square miles, composed of magnificent trees, mainly Douglas pines. This forest grows in an arid region, and if destroyed could never recover itself. It protects the headwaters of the northern branches of Gila River, which waters the garden of Arizona. No part of this region has been reserved.

The finest timber region of California is in the northern Sierra and the northern Coast Ranges. Here are the sugar pines and the redwoods; but none of this region has been reserved. The Coast Ranges of Oregon contain some of the finest timber of the State, but no reserve has been established there. On the other hand, we find, as was stated above, reservations established in the San Bernardino and San Jacinto Mountains, where there is no timber, and where the vegetation is not in the slightest danger of being injured.

The purpose of those who urged the reservation of these areas from sale or settlement, was to effect thereby a cessation of forest fires and the regulation of cutting of timber. It was not, as is commonly supposed, the withdrawal of them as a source of supply of lumber, but decidedly the reverse. It was expected that Congress would provide immediately for their use as a source of timber, under rules and regulations whereby the cutting would be so regulated as to make them a perennial source of lumber supply. To this end bill after bill has been introduced and pushed to various stages during the past six years, but until the present session no such bill has been passed and no authority has been given the Secretary of the Interior for making any such provision. The list of attempts at securing this much-needed legislation is long, and meantime the reserves have lain idle and unprotected, of no service to any one, and annually scourged by fire.

The thirteen reserves established by Executive order of February 22, 1897, include several areas of great importance to local

interests, and the withdrawal of these areas created at once great opposition. Under this pressure the Fifty-fourth Congress, in its last session, attached a rider to the Sundry Civil Bill abolishing all reserves. This bill failed of approval by the President, but the matter was taken up again in the extraordinary session of the Fifty-fifth Congress, and all the probabilities were in favor of undoing the work of the friends of the forest by the abolition of the entire reserve system. A compromise was, however, effected in the form of an amendment to the Sundry Civil Bill which, in substance, provided that the order of February 22, 1897, creating thirteen reserves, be suspended until March 1, 1898, and that meantime a survey of the reserves be made, for which the sum of \$150,000 was appropriated, and that a Forestry Bureau be organized in the Department of the Interior for the purpose of administering the reserves. This amendment passed the House and the Senate by a narrow margin of votes, and has become a law.

Under its provisions topographic forestry surveys are to be made by the Geological Survey, the reserves are to be subdivided, and the agricultural tracts within their boundaries are to be excluded. A forest policy is to be planned and the necessary organization for administering the reserves is to be created.

It is the hope of all reasonable men who take an interest in this matter, that the ultimate result of this agitation will be the withdrawal from entry and sale of all lands belonging to the Government which are of more value for their timber than for agricultural or mining purposes; that they will be protected from fire or other destructive agencies, and that the cutting of timber upon them will be regulated in such way as to maintain a continuous supply of lumber. While such action may be at first opposed by Western people, as working a hardship upon them, it seems clear that in time the wisdom of such provisions will become apparent and such a forest policy will receive their hearty support.

HENRY GANNETT.